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The Water Under Our Feet

The Essential Undertaking of Aquifer Recharge

by Torrey Douglass

One of my favorite things about living in Mendocino County is watching the turn of the seasons. I love the four distinct segments of the year, each with its own flavor profile of scents and sights. As I write this, the hills are covered in fresh green grass—the kind that inspires my cows to break out of their corral and go on walkabout to fill their bellies. By the time you are reading this, though, that green will mostly or entirely have dried into a crispy gold, thanks to the summer sun.

The green grass is evidence of the abundant 2023-2024 rainy season. Storms blew through at nicely paced intervals, and the rain was rarely torrential, allowing the moisture to seep into the ground while also minimizing flood risk. There were stretches of good weather between those downfalls, sparing us from the bane of El Niño— weeks of uninterrupted dreariness that can weigh heavy on the souls of sun-lovers. But anyone who has lived in this area for a decade or more can testify that such advantageous rainy seasons are not a given. California suffered extreme droughts from 2012 - 2016 as well as 2020 - 2022, some of the worst on record. Local ponds and reservoirs dried up, trees weakened and frequently succumbed to disease, and the fire risk climbed to ever-higher levels, inspiring an unrelenting, anxious vigilance in area residents from August through October.

According to Laura Elisa Garza Díaz, Ph.D., droughts like 2012 - 2016 will happen again, increasing in length, frequency, and intensity as climate change reshapes our natural environment. Dr. Garza Díaz is the Area Water Quality, Quantity, and Climate Change Advisor at the U.C. Department of Agriculture and Natural Resources, part of the U.C. Cooperative Extension, and her focus is Mendocino and Lake counties. "When we have a wet winter, we forget about drought," Dr. Garza Díaz observes. "But due to climate change, drought resiliency is a high priority."

Dry years force Californians to rely almost exclusively on the groundwater in aquifers accessed via wells, but groundwater is not an infinite resource. Like our forests, aquifers must be utilized judiciously in order to avoid over-extraction to the point of depletion. With this in mind, California passed the State Groundwater Management Act (SGMA) in 2014. Regulating groundwater is not unusual—both Washington state and even regulation-averse Texas have been doing it since the 1940s, and Florida and Kansas passed their own laws in the 1970s.

The SGMA has rated groundwater basins throughout the state. The Central Valley, where farms rely heavily on water pulled from aquifers to irrigate crops, was deemed a high priority basin, while the Ukiah Valley Basin was rated a medium-priority region. The assessment resulted in the formation of the Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA), an organization that encompasses the County of Mendocino, the City of Ukiah, the Upper Russian River Water Agency, and the Russian River Flood Control and Water Conservation and Improvement District. This group is responsible for creating a Groundwater Sustainability Plan which will serve as "a strategic roadmap to secure the sustainable management of groundwater within the basin within a two-decade timeframe," according to Dr. Garza Díaz.

The plan submitted by UVBGSA was approved by the state, which is fortunate as it keeps our groundwater management strategy under local control. Meetings are open and public input is welcome—find details on the UVBGSA website, ukiahvalleygroundwater.org. The agency has proposed a number of strategies but must select just a few to pursue as funds are limited. Ideas include expanding the City of Ukiah Recycled Water Project, rehabilitating existing reservoirs, constructing off-stream tanks for storage, and digging injection wells—wells designed to send water to the aquifer rather than pulling from it.

Restoring water to aquifers, known as Managed Aquifer Recharge (MAR), is essential to the future sustainability of California. Some farmers in the Central Valley have started flooding their fields after a heavy downpour, allowing the water to percolate down to the water table. This practice has the added benefit of activating microbes in the soil that accelerate the decomposition of the nitrates that have built up over time from repeated applications of fertilizer. Grape growers in Alexander Valley are also considering intentional flooding of the vineyards to restore water to the aquifers.

There are a number of things you can do on your own property to help recharge groundwater. While you can't capture rain runoff in a human-made pond without a permit, you can slow it down to allow it time to sink into the soil. Building up mounds of earth, called swales, in strategic locations can help, though it's recommended to utilize professionals like Village Ecosystems in Ukiah, since swales must be engineered appropriately to avoid landslides, foundation damage, and erosion.

If you want a truly DIY approach to implementing MAR on your property, consider planting a rain garden. When paired with rainwater harvesting, you can create a low maintenance system for sending precipitation back to the aquifer on which your home relies. In Mendocino County, you do not need a permit for water tanks under 5000 gallons, so choose one below that limit to keep things simple. Locate the tank on a level surface next to your house and install gutters that deliver water to it. Be sure the water passes through a screen before going into the tank in order to filter out solids.

Typically, a tank under 5000 gallons will not store an entire season's worth of rain, so plant your rain garden nearby and direct the tank's overflow to it. Be sure the garden is situated at least 10 feet away from your home's foundation. Ideally, the garden's location will be near an impermeable surface, like a driveway, that delivers runoff to the site. You can dig out a basin to collect the rain and runoff if there is not already a natural depression that collects rainwater at that spot. The rain garden requires percolating soil, so if you have a lot of clay, amend the soil appropriately.

The basin should include three zones: the bottom, a higher terrace level around that, and the top. The basin does not need to be deep—5" is sufficient—but an overall size of at least 150 square feet is recommended. If you are digging the basin yourself rather than using a pre-existing depression, you can use the removed soil to create a berm around the basin. At the bottom of the basin, use plants that have a high tolerance for moisture, as they will be submerged for the longest time. Take inspiration from your surroundings and use the type of plants you see growing in the beds of seasonal streams. The terrace zone should contain plants that thrive in both wet and dry conditions. These plants can reach the water in the basin bottom with their roots, and will be submerged themselves after heavier storms. The plants at the top should tolerate primarily dry conditions, so select drought-tolerant options for that zone.

All these plants should be native, be they shrubs, flowers, grasses, or trees. Native plants are adapted to the local soil and typically have much deeper roots than their imported alternatives. The deeper the roots, the more moisture can be pulled from the surface down into the ground, where it can be stored in soil, plants, and ultimately, the aquifer. You can also select plants that are pollinator- friendly in order to provide food and habitat for bees, butterflies, and hummingbirds.

Once the rainwater collection system is in place and the plants are in the ground, it takes relatively little effort to maintain, as native plants do not need much irrigation or inputs. Linda MacElwee, the Watershed Coordinator at the Mendocino County Resource Conservation District, recommends planting fruit trees around the basin if there's room. They can help build the water-holding capacity of the soil while also providing shade, beauty, and food.

It feels like we are living in a time when a number of bills for past behaviors are coming due. When it comes to groundwater, there's been a lot of taking and not a lot of giving, and that must change. Rain gardens can help bring balance to our relationship with the aquifers we rely on, a balance that is necessary for our survival as we move into a future defined by new and intense climate conditions. Thankfully, while this underground resource may remain out of sight, it's no longer out of mind, and we can take measures to ensure its sustainability for generations to come.

Follow the UVBGSA at ukiahvalleygroundwater.org.

Water photo by Jenn Wood courtesy of Unsplash. Rain garden photo by Linda MacElwee.

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